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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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|-----------------|-------------|----------------------|---------------------|------------------|

10/049,173

02/08/2002

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BAYER-3 (PCT)

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09/08/2005

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ART UNIT

PAPER NUMBER

3681

DATE MAILED: 09/08/2005

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/049,173
Filing Date: February 08, 2002
Appellant(s): BAYER, THOMAS

Thomas Bayer
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed on July 27, 2005 appealing from the Office action mailed March 14, 2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

| | | |
|-----------|--------------------------------------|--------|
| 2,591,967 | RIDGELY ET AL. | 4-1952 |
| 6,099,432 | SHIROKOSHI (U.S. equivalent of DE | 8-2000 |

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19840968A1)

DE 19840968A1

SHIROKOSHI

11-1999

5,045,035

GANOUNG

9-1991

Shigley and Mitchell, "Mechanical Engineering Design", Fourth Edition, 1993, pp.588-592

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ridgely '967.

Ridgely teaches a three stage, speed-reducing planetary transmission having, in each stage, a driven sun wheel 11 rolling in an internal gear 15 and interacting with a planet wheel 16 mounted on a planet carrier 21, in which the sun wheels of the second and third stages are each driven by the planet carrier of the preceding stage, and fixed transmission housing 12, in which at least the internal gear of the third stage is rigidly connected with the transmission housing (Fig. 1) and the internal gears of the first and second stages are each rigidly connected with the transmission housing (Fig. 1), and in which, furthermore, the planet carriers of the second and third stages are each provided with four planet wheels in a circumferential direction (Fig. 2), characterized by the features: the internal gears have a number of teeth in all three stages, and

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the transmissions have ratios. Ridgely does not specifically teach the number of teeth to be 108 or the ratios of the second stage and third stage being 4 and 5.5, respectively. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Ridgely to employ specific number of teeth and specific ratios, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shirokoshi '968 (U.S. equivalent: US 6,099,432). Shirokoshi teaches a three stage, speed-reducing planetary transmission having, in each stage, a driven sun wheel 14,24,45 rolling in an internal gear 11,21,32 and interacting with a planet wheel 13,26, 41 mounted on a planet carrier 12,25,20, in which the sun wheels of the second and third stages are each driven by the planet carrier of the preceding stage, and fixed transmission housing 2, in which at least the internal gear of the third stage is rigidly connected with the transmission housing (Fig. 2) and the internal gears of the first and second stages are each rigidly connected with the planet carrier of the third stage (Fig. 2), and in which, furthermore, the planet carriers of the second and third stages are each provided with four planet wheels in a circumferential direction (Fig. 1), characterized by the features: the internal gears have a number of teeth in all three stages, and the transmissions have ratios. Shirokoshi does not specifically teach the number of teeth to be 108 or the ratios of the second stage and third stage being 4 and 5.5, respectively. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Shirokoshi to employ specific number of teeth and specific ratios, since such a modification would have involved a mere

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change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

(10) Response to Argument

Applicant does not argue the fact that Shirokoshi and Ridgely teach the respectively claimed transmission structures (see claims 8 and 9; Figs. 1 and 2).

A) Applicant argues that the inventor was able to achieve an unexpectedly and surprisingly beneficial result by “discovering that it is possible to utilize non-even-number translation ratios.”

The newly cited Ganoung US 5,045,035 art is currently being referenced. This is a regular transmission patented in 1991. This transmission illustrates a non-even translation ratio.

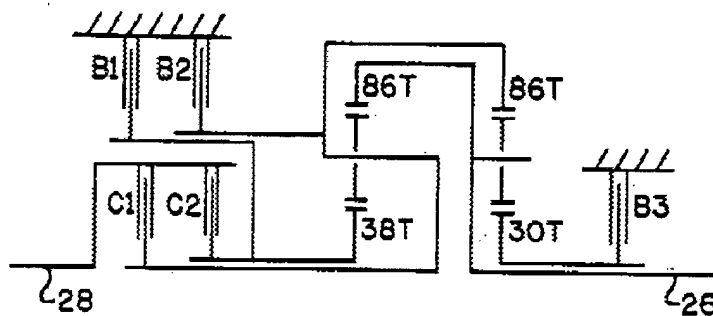


FIGURE 2

Given the transmission, and using the third speed ratio, power would only come through the input shaft 28, through the carrier (via C1) and up to ring gear 86T. Since sun 30T is braked, the output would go through output shaft 26.

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The translation ratio of said third speed is as follows:

| | | LOOKUP CL. 23 | C1 | C2 | B1 | B2 | B3 | RATIO | RATIO GAP |
|--|-----------------|------------------|----|----|----|----|----|-------|--------------|
| GEARSHIFT THROTTLE DIP ↑ NO ↓ YES | R | | | X | | X | | -3.16 | |
| | 1 ST | | | X | | | X | 2.98 | |
| | 2 ND | X | | X | | | X | 2.14 | → 1.395 |
| | 3 RD | X | X | | | | X | 1.35 | → 1.585 |
| | 4 TH | X | X | X | | | | 1 | → 1.349 |
| | 5 TH | X | X | | X | | | 0.694 | → 1.442 |

FIGURE 3

Third speed has a 1.35 translation ratio, which is a non-even translation ratio. Non-even translation ratios have been known in the art, because a translation ratio is a mathematical formula that uses the number of gear teeth as a variable.

The formula for the translation ratio of a planetary gear set (as derived from Shigley and Mitchell cited above) is as follows:

$$e \text{ (with the ring (aka internal) gear braked)} = \frac{\# \text{ sun gear teeth} * \# \text{ planetary gear teeth}}{\# \text{ planetary gear teeth} * \# \text{ ring gear teeth}}$$

Using the claimed 108 internal (ring) gear teeth, one can manipulate the # of teeth on either the sun or planetary gears to attain various translation ratios. Using randomly selected numbers (20 sun teeth and 30 planetary teeth) to go with the chosen 108 internal teeth, the translation ratio is calculated to be 0.185. This, again, is a non-even translation ratio.

Using non-even translation ratios is not a patentable limitation.

B) Applicant argues that changing a ratio is more than a mere change in size of the planetary structure and finding the optimal range. Given the same exact transmission, and the translation ratio formula, one of ordinary skill in the art can change the gear teeth numbers to achieve a desired ratio. Depending on the pitch and size of the gear teeth, the size of the assembly may have to be increased or decreased to accommodate the selected number of teeth. However, it has been shown that the change in size of a structure known in the art involves only routine skill in the art.

C) Applicant argues that there is some significance with using 4 planet wheels. Shirokoshi teaches that this is already known in the art (Fig. 6). Also, the number of planet wheels does not change the translation ratio. The additional number of wheels merely reduces the stress per planet wheel.

D) Applicant argues that *In re Rose*, USPQ237 (CCPA 1955) is not analogous to this case. Applicant states that the change in lumber packages of different sizes did not produce “unexpected results” as the current invention claims to do. However, as stated earlier, the results are not unexpected, as translation ratios are calculated via a known formula. Therefore, given the claimed transmission structure (which applicant does not argue), changing the size of the transmission to accommodate the number of teeth/gear to achieve the desired translation ratios involves only routine skill in the art. The present invention, as claimed, does not distinguish itself over the previously cited art.

E) Finally, applicant has cited various case laws to (in essence) state that:

- 1) No prior art specifically discloses the claimed translation ratios, given the number of internal gear teeth.
- 2) Unexpected results must be considered when deciding if an application is patentable.

1) With regard to the first argument, in order to provide a prior art that specifically teaches an internal gear teeth number of 108 and the translation ratios of 4 and 5.5, said art would have to be an infinitely paged table of all the combinations of teeth numbers and translation ratios. However, this is unnecessary, since the formula for said translation ratio is known in the art.

Therefore, a secondary reference with the exact number of teeth and translation ratios, as claimed, need not be found.

2) With regard to the second argument, “unexpected results” often arise in the biological and chemical arts, when previously known combinations are combined in a different order, or combined using a slightly different method, thereby providing unexpected results. In the present invention, applicant is changing the number of teeth to manipulate the translation ratio of a transmission. These results are not unexpected.

Final Argument:

Shirokoshi and Ridgely teach the same transmission structures as claimed. Although applicant has disclosed the advantages of the present invention, in the end, applicant is simply changing the gear teeth numbers (and therefore sizes) to achieve desired translation ratios.

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Changing the number of teeth in a known formula is not a patentable limitation, and is not new to the art.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,


Roger Rang

Conferees:

Ha Ho 

Charles Marmor 